

**What is claimed is:**

1           1.    A carbon nanocapsule thin film, prepared by  
2           electroplating a plurality of carbon nanocapsules onto a  
3           substrate.

1           2.    The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the carbon nanocapsule is a polyhedral  
3           carbon cluster constituted by having concentric multi-  
4           layers of closed graphitic sheet structure. The diameter  
5           of a carbon nanocapsule is about 3-100 nm.

1           3.    The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the carbon nanocapsule is hollow.

1           4.    The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the carbon nanocapsule is a metal-filled  
3           carbon nanocapsule filled with metals, metal oxides,  
4           metal carbides, or alloys.

1           5.    The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the thickness of the carbon nanocapsule  
3           thin film is 20nm-1mm.

1           6.    The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein a redox agent or an external electric  
3           field is applied to offer a driving force for  
4           electroplating.

1           7.    The carbon nanocapsule thin film as claimed in  
2           claim 6, wherein the potential of the external electric  
3           field is 0.01V-6V.

1           8. The carbon nanocapsule thin film as claimed in  
2 claim 1, wherein the carbon nanocapsules comprise a  
3 functional group.

1           9. The carbon nanocapsule thin film as claimed in  
2 claim 8, wherein the functional group carries at least  
3 one positive charge after dissociation.

1           10. The carbon nanocapsule thin film as claimed in  
2 claim 9, wherein the functional group is amine or  
3 quaternary ammonium.

1           11. The carbon nanocapsule thin film as claimed in  
2 claim 8, wherein the functional group carries at least  
3 one negative charge after dissociation.

1           12. The carbon nanocapsule thin film as claimed in  
2 claim 11, wherein the functional group is carboxyl group,  
3  $\text{SO}_4^-$  or  $\text{PO}_4^-$ .

1           13. The carbon nanocapsule thin film as claimed in  
2 claim 1, wherein the carbon nanocapsules is 20-100 vol%.

1           14. A carbon nanocapsule thin film preparation  
2 method, comprising:

3               providing a substrate; and  
4               electroplating a plurality of carbon  
5               nanocapsules onto the substrate.

1           15. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the carbon  
3 nanocapsule is a polyhedral carbon cluster constituting  
4 multiple graphite layers having a balls-within-a ball

5 structure, and the diameter of a carbon nanocapsule is 3-  
6 100 nm.

1 16. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the carbon  
3 nanocapsule is hollow.

1 17. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the carbon  
3 nanocapsule is a metal-filled carbon nanocapsule filled  
4 with metals, metal oxides, metal carbides, or alloys.

1 18. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the thickness of  
3 the carbon nanocapsule thin film is 20nm-1mm.

1 19. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein a redox agent or  
3 an external electric field is applied to offer a driving  
4 force for electroplating.

1 20. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 19, wherein the potential of  
3 the external electric field is 0.01V-6V.

1 21. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the carbon  
3 nanocapsules comprise a functional group.

1 22. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 21, wherein the functional  
3 group carries at least one positive charge after  
4 dissociation.

1           23. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 22, wherein the functional  
3 group is amine or quaternary ammonium group.

1           24. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 21, wherein the functional  
3 group carries at least one negative charge after  
4 dissociation.

1           25. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 24, wherein the functional  
3 group is carboxyl group, SO<sub>4</sub><sup>-</sup> or PO<sub>4</sub><sup>-</sup>.

1           26. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the carbon  
3 nanocapsules is 20-100 vol%.